

## Can Geographic Coordinates in the Catalog Record Be Useful?

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*Prior to the automation of library catalogs, searching by geographic coordinates was conducted using index maps. The Library of Congress has recently made it a requirement to include geographic coordinates in library catalog records despite the inability of many automated catalogs to search for coordinates. However, emerging technologies can make the addition of geographic coordinate data useful and enhance the ability to access geographic information via different arenas outside the library. One of the most useful applications of geographic coordinates in library catalog records is the ability to create a geographic search interface.*

**KEYWORDS** *coordinate searching, geographic coordinates, library catalog records*

### INTRODUCTION

The early months of 2008 brought some changes to the way format data is collected for cartographic materials for national level cataloging using the MARC21 bibliographic data standard. This change involved adding geographic coordinates to the Mandatory if Applicable category within fields 034 and 255 in the National Level Full and Minimal Requirements of the MARC21 Format for Bibliographic Data. Previously, including geographic coordinate data was considered optional for the cataloger; therefore, these important data typically were left out of the bibliographic record being created. According to the requirements (Library of Congress, 2008), “National level records are required to contain sufficient cataloging information to allow them to be used by various agencies: National and world-wide.” The inclusion of geographic coordinate data as a cataloging requirement when coordinates

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appear on the cartographic item is commendable, because this information will allow cataloged map collections to be accessible in an entirely new way. The Library of Congress has been working toward adding coordinate information to all their authority records since this change occurred, so any library who copies catalog records from the Library of Congress will have this fundamental information in their own catalog.

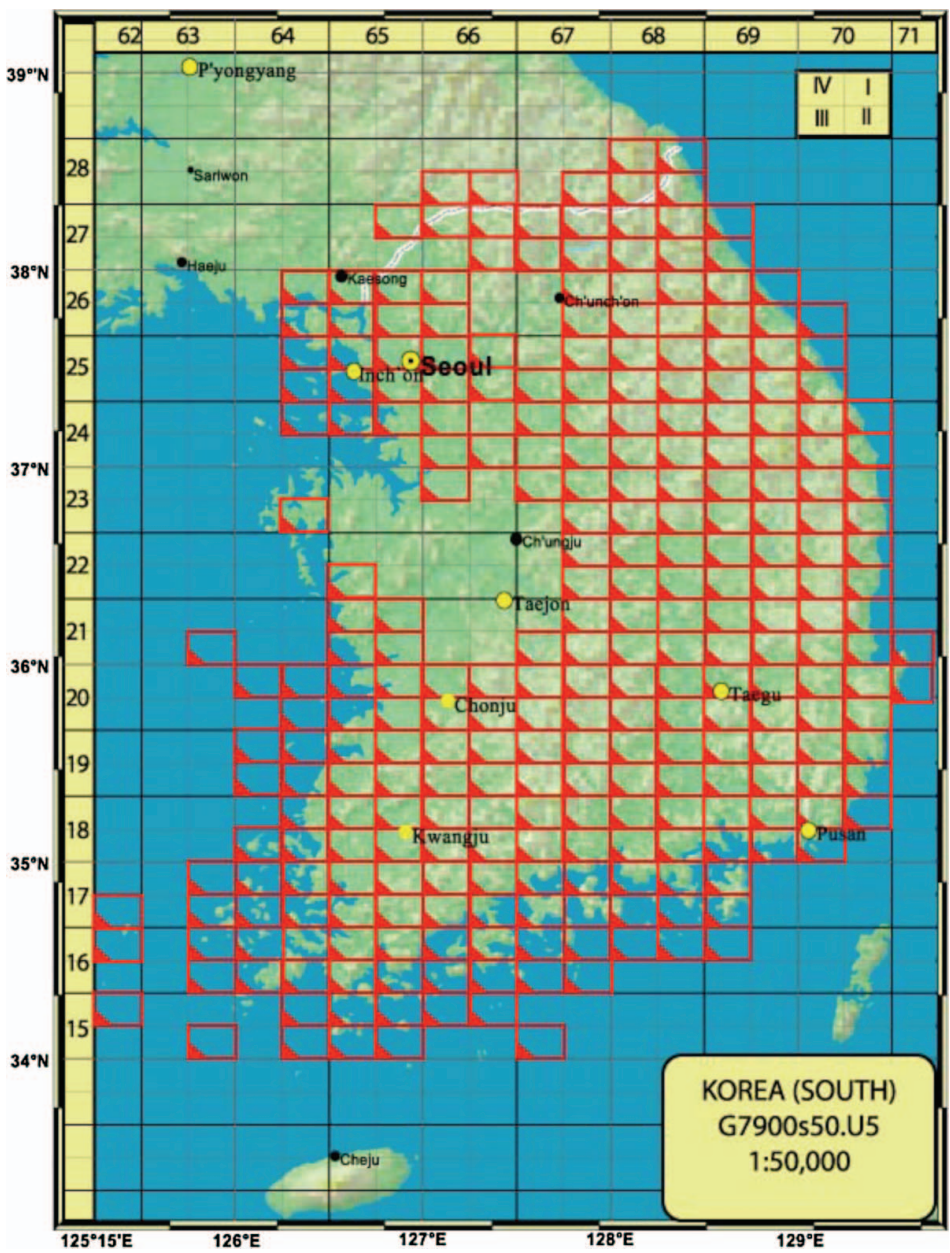
Prior to this 2008 change, many libraries that cataloged map collections left out the coordinate information in the record even if it was clearly provided on the map. This occurred primarily because it is time consuming and requires an understanding of coordinate systems that many catalogers do not have. Due to this general lack of knowledge and understanding, the number of people who walk into a library and ask for a map using geographic coordinates instead of the name of a city or country is minimal. However, that has the potential to change as the use of electronic mapping products and the collection and use of geographic data becomes more ubiquitous. Users who carry a cell phone, use handheld or watchlike GPS units, or explore the world virtually using Google Earth, and so forth, can easily locate geographic coordinates for a given point, area, or region and then wish to have a physical map of the area—which could then result in the request for a map using those coordinates as a search technique.

However, if the fundamental system that librarians use for searching the online public access catalog (OPAC) does not provide adequate search functionality for geographic coordinates, inclusion of this information in the catalog record can prove ineffective. Search functionality that produces reliable, relevant results when a geographic coordinate search is performed is essential to serve patrons who search for a location by geographic coordinates in the OPAC. Many new catalog interface products and innovative developments in Web 2.0 search capabilities show promise at being able to make this new requirement a fruitful endeavor (Gonzales 2007).

### Searching for Cartographic Materials in Library Catalogs

Before the automation of library catalogs, searching by geographic coordinates was conducted using paper index maps (Figure 1). These index maps existed primarily for sets of topographic maps covering large geographic areas, not for maps of smaller administrative areas or cities. Each library could use their index maps to make notations regarding which sheets they held in their own collections, and create an easy-to-use visual search product that could be searched by coordinates. The example in Figure 1 shows an index map of South Korea with library holdings information marked in red and coordinates visibly labeled on the left-hand side and at the bottom of the map.

Additionally, although some map collections had been cataloged before automation, inclusion of geographic coordinates on a catalog card was rare. Searching this field using catalog cards was not possible as most searching



**FIGURE 1** Index map of South Korea, from the Penn State University Donald W. Hamer Maps Library.

was done on the title/author/subject level, hence the reliance on index maps for performing geographic searches.

Automation of library catalogs, begun in the late 1960s, held great promise in expediting searching for materials in and across libraries,

**Search Results**

Keywords Anywhere "South Korea" search found 128 titles  
Pages << 1 2 3 4 5 6 7 >>

#1	<b>Microfilm Cd17221</b> <a href="#">Details</a> <a href="#">Mark</a> <b>Barriers to entry analysis of broadband multiple platforms [electronic resource] : comparing the U.S. Park, Eun-A.</b> Copy available at Annex (UP) in Submit request for annexed material
#2	<b>Microfilm Cd17107</b> <a href="#">Details</a> <a href="#">Mark</a> <b>Prestige-oriented view of college entrance and shadow education in South Korea [electronic resource] on private tutoring</b> Lee, Soojeong. Copy available at Annex (UP) in Submit request for annexed material
#3	<b>Microfilm Cd15032</b> <a href="#">Details</a> <a href="#">Mark</a> <b>The evolution of leisure studies in North America and South Korea [electronic resource] : a study of</b> Shim, Jae-Myung, 1967- Copy available at Annex (UP) in Submit request for annexed material
#4	<b>VK910.K6 2004</b> <a href="#">Details</a> <a href="#">Mark</a> <b>East Coast of Korea Pilot (port guide) : October 2004 12th ed., 2004.</b> Korea (South). Ministry of Maritime Affairs and Fisheries. National Oceanographic Research Institute. Copy available at Maps Library (UP) in Maps Library, Central Pattee, Basement- Sheet Map Collection
#5	<b>G9237.J3 2004.K6</b> <a href="#">Details</a> <a href="#">Mark</a> <b>East Sea and Yellow Sea. [cartographic material]</b> Korea (South). Ministry of Maritime Affairs and Fisheries. Copy available at Maps Library (UP) in Maps Library, Central Pattee, Basement- Sheet Map Collection

**FIGURE 2** “South Korea” search results from the Penn State University Donald W. Hamer Maps Library; only results #4 and #5 correspond to actual maps in the collection, whereas the first three do not.

including maps, and for the most part has been successful in making library collections more accessible. However, searching for maps can still be a frustrating task within current online catalogs. For example, a patron looking for a map of South Korea might type into the search box “South Korea” as a keyword and then limit the search to a map library location as an attempt to weed out nonmap-related search results. The results could look something like Figure 2, wherein only two of the five results are actually for maps.

On the other hand, had one typed in the official form of the geographic name—“The Republic of Korea”—and continued limiting the results to the map library location, the outcome would have been very different and have looked something like the results in Figure 3, in which each of the five retrieved records is for a map.

Although out of two keyword searches, seven of the ten retrieved records returned desired and relevant results, the examples above illustrate some frustrations that can arise when performing a typical search for cartographic materials without knowing the proper names of places and geographic features. Imagine then the difficulty a patron might encounter when

**Search Results**

Keywords Anywhere "Republic of South Korea" search found 24 titles.  
Pages << 1 2 >>

#1	<b>VK910.K6 2004</b> <b>East Coast of Korea Pilot (port guide) : October 2004 12th ed., 2004.</b> Korea (South). Ministry of Maritime Affairs and Fisheries. National Oceanographic Research Institute. Copy available at Maps Library (UP) in Maps Library, Central Pattee, Basement- Sheet Map Collection
#2	<b>G7902.T64 2004.K6</b> <b>Dokdo. [cartographic material]</b> Korea (South). Ministry of Maritime Affairs and Fisheries. Copy available at Maps Library (UP) in Maps Library, Central Pattee, Basement- Sheet Map Collection
#3	<b>G9237.J3 2004.K6</b> <b>East Sea and Yellow Sea. [cartographic material]</b> Korea (South). Ministry of Maritime Affairs and Fisheries. Copy available at Maps Library (UP) in Maps Library, Central Pattee, Basement- Sheet Map Collection
#4	<b>G7900 2003.N3</b> <b>The two Koreas ; The forgotten war, three long years in Korea [cartographic material]</b> National Geographic Maps (Firm) Copies available at Maps Library (UP)
#5	<b>QE75.O9 no.97-470-F</b> <b>Maps showing geology, oil and gas fields and geologic provinces of the Asia Pacific Region [electronic resource]</b> Geological Survey (U.S.) Copy available at Annex (UP) in Submit request for annexed material

**FIGURE 3** “Republic of Korea” search results from the Penn State University Donald W. Hamer Maps Library; all results correspond to actual maps in the collection.

attempting to obtain a proper set of coordinates to produce desired and relevant results in a search using geographic coordinates.

### Geographic Coordinate Searching in Library Catalogs

Performing a search using geographic coordinates comes with a host of questions patrons and librarians must ask themselves. For instance, Do I search using decimal degrees or degrees, minutes, and seconds? Do I search a bounding box or for a center point? Do I search for a general range of coordinates for a larger region with hopes of capturing a particular area or a more specific set of coordinates to home in on the desired area? The most important of these questions is the first—Decimal degrees or degrees, minutes, and seconds? The answer is in knowing which system is used in the creation of catalog records.

The discussion on Coordinates in Authority Records of MARC21 Proposal No. 2006-06 states that

In bibliographic records, coordinates appear in textual form in subfield \$c of the field 255 and in structured form in field 034. The data in field 034 may be given either as decimal degrees, or as degrees, minutes and seconds with the presence of the decimal indicating which is used. The west, east, north and south hemispheres are indicated either with the first letter of the direction or by a plus or minus sign. This paper proposes



		Australia's great desert tracks atlas & guide [cartographic material] / contributors, Len Zell, Ian Glover	
Bib ID	3807946		
Format	 <b>Map</b>		
Author	<a href="#">Hema Maps (Firm)</a>		
Edition	1st ed.		
Scale	Scale differs (E 154°00'—E 112°00'/S 9°00'—S 44°00').		
Description	Eight Mile Plains, Qld. : Hema Maps & Wild Discovery Guides, 2007. 1 atlas : col. ; cm.		
ISBN	9781865003825 (pbk.) 1865003824 (pbk.)		
Subjects	<a href="#">Roads - Australia - Maps.</a>   <a href="#">Roads - Australia - Guidebooks.</a>   <a href="#">Roads - Australia, Central - Maps.</a>   <a href="#">Roads - Australia, Central - Guidebooks.</a>   <a href="#">Deserts - Australia - Maps.</a>   <a href="#">Deserts - Australia - Guidebooks.</a>   <a href="#">Deserts - Australia, Central - Maps.</a>   <a href="#">Deserts - Australia, Central - Guidebooks.</a>   <a href="#">Australia - Maps.</a>   <a href="#">Australia - Guidebooks.</a>   <a href="#">Australia, Central - Maps.</a>   <a href="#">Australia, Central - Guidebooks.</a>		
Other Authors	<a href="#">Zell, Len</a>   <a href="#">Glover, Ian (Ian Thomas), 1949-</a>   <a href="#">Sakker, Elizabeth</a>   <a href="#">Wild Discovery Guides (Firm)</a>		
Also Titled	Australia's great desert tracks atlas and guide		
Available From	Hema Maps, PO Box 4365 Eight Mile Plains QLD 4113		

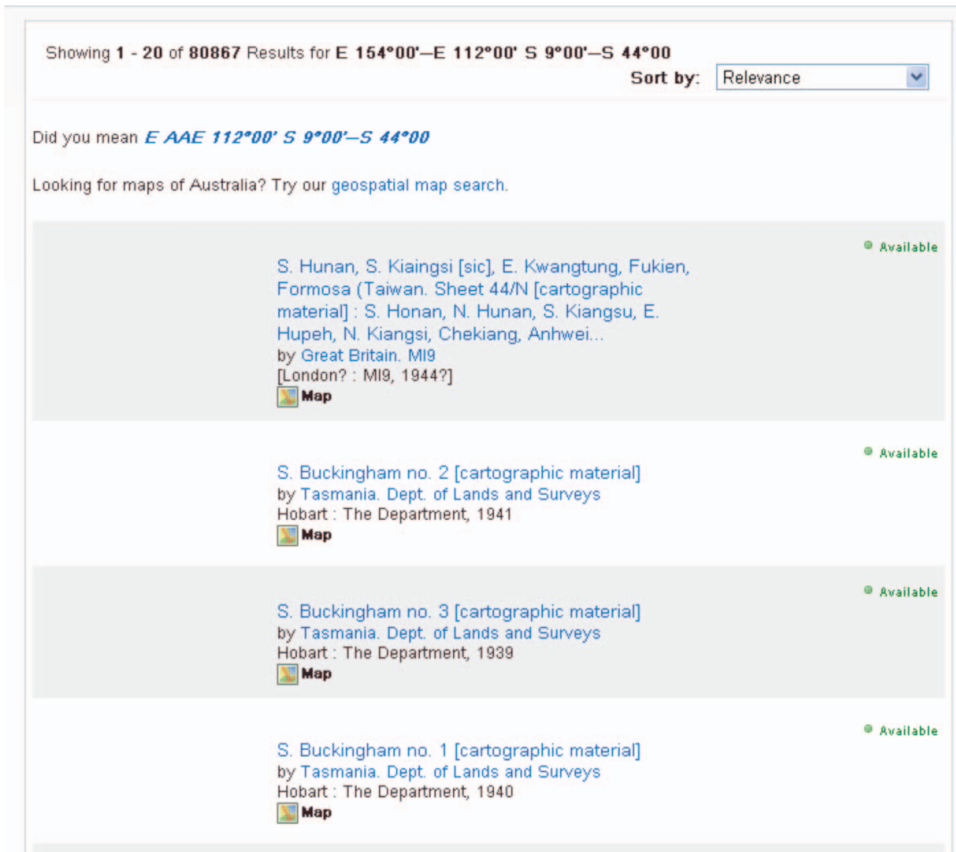
**FIGURE 4** Example of a coordinates search in a MARC21 record created by the National Library of Australia's Catalogue.

only the definition of field 034 and not the textual form in field 255 in the MARC 21 authority record, because the structured form is needed to utilize the data for coordinates-based machine retrieval. (Library of Congress, 2006)

The only drawback to this statement is that there is not a clear indication of which coordinate system should be used to populate the 034 field. This can lead to confusion for the user when performing a search using geographic coordinates.

Once the user determines which coordinate system is in use, most usually through trial and error, searching for a map or data file using geographic coordinates can begin. The example above shows the complexities of searching with geographic coordinates in online catalogs when using a known item. The item is titled *Australia's Great Desert Tracks Atlas & Guide*. As seen in Figure 4, the bibliographic record contains geographic coordinates in the degrees, minutes, and seconds format.

There could be some other items located in the catalog containing similar coordinates, but it is expected that when performing a simple keyword search on the coordinates displayed in the record in Figure 4, the results would contain that specific record. However, as shown in Figure 5 below, it



**FIGURE 5** Geographic coordinate search results, National Library of Australia's Catalogue.

is clear that this is not the case. The atlas does not show up in the top five results, even when limited to maps as a format.

So, if by including geographic coordinates in authority files, the goal is to allow more robust searching and increased access to collections, this example may show that in the confines of traditional library catalog search mechanisms—within the online catalog—it is not possible. If true, then there must be another way for librarians to make use of geographic coordinates to increase access to their map and geographic data collections.

## Library Catalog 2.0

Including geographic coordinates in bibliographic records stands to be one of the most important decisions a map cataloger can make in an effort to increase the accessibility of map and geographic data collections—outside of the catalog. Though the usefulness of searching by geographic coordinates

can be questioned for use in today's library catalogs, there are many other search tools and technology developments that make this decision a straightforward task. These developments can be grouped into two categories: next generation catalog interfaces and geographic interfaces.

#### NEXT GENERATION CATALOG INTERFACES

A number of companies have developed applications to provide library catalogs with a different user interface to make searching more user-friendly. They provide new services such as faceted searching, the ability to personalize search spaces, federated searching, and searching across all library collections, including digital and data collections. Many of these applications also allow users to tag records with words and descriptions they deem relevant to a particular item. How will the development of these new tools help users searching for items using coordinates? First, search algorithms may be written in a way to create a more robust search engine capable of searching more accurately across all MARC21 fields. Second, with the integration of faceted searching, it could be possible for an individual to begin a search using coordinates and continue the search using facets that limit to a geographic region. For example, if a user had coordinates for an area of Italy and were to perform a keyword search, his or her search may not turn up the most accurate results. The user can then use facets to narrow down the search.

#### GEOGRAPHIC SEARCH INTERFACES

One of the most useful applications of geographic coordinates in library catalog records is the ability to pull those coordinates into a geographic search interface that exists outside the online library catalog. With the geographic search interface, a user can search for an item according to its location on a map rather than by less-accurate textual means. Looking for a book written in or about England? Click *England* on the map and see the records available in a library. Looking for a music score by Mozart? Click on *Salzburg, Austria*, to see what is available. Looking for a map or a data set for the Seychelles? Click on the island group and explore collections. Libraries and industry are starting to explore creating access to their collections with these ideas.

The University of Minnesota's John R. Borchert Map Library recently created a resource called MapHappy.<sup>1</sup> Using a Google Maps interface, users can search for maps by their geographic location. Each item is represented as a pin on the map, and a link to the catalog record is provided once the pin is clicked (Johnston and Jensen, 2009). The Texas A&M University Libraries digitized the *Geologic Atlas of the United States*<sup>2</sup> and created a Yahoo!Map interface for accessing the digital images by creating Dublin Core metadata



from coordinates and it has reproduced maps in the set for viewing in Google Earth. The National Library of Australia<sup>3</sup> has created the Maps of Australia interface, allowing users to search the print and digital map collections in libraries across Australia by navigating on a map. The user zooms to a particular region, limits the search to map type or scale, if desired, and clicks the search icon. The result is a catalog listing of maps in the collection that fall into the region and subject selected.

The United States Geologic Survey uses a similar interface for their online store with 7.5-, 15-, and 30-minute footprints available to help a user define which topographic map sheet is needed. The David Rumsey Historical Map Collection<sup>4</sup> website is using coordinate information and geo-referenced points on scanned maps to make collections available via Google Earth (Cartography Associates 2010). Perhaps one of the best representations so far showing how collections can be brought together using geographic coordinates is Harvard's AfricaMap.<sup>5</sup> Their goal in creating this resource was to "make spatial data on Africa easier for researchers to discover and explore." (Harvard 2008; Bol, Lewis, and Guan 2008)

Another useful product would be the development of application program interfaces that work with geographic coordinates to pull information into other search sites such as the Hathi Trust digital repository, Open Library, Google Book Search, and the Virtual International Authority File (VIAF). All these examples show how the addition of coordinate data to MARC21 bibliographic records can be used outside of library catalogs to increase access to and use of map and geographic data collections.

## CONCLUSIONS

Can geographic coordinates in the catalog be useful? Evidence shows there are numerous arguments for the inclusion of geographic coordinates in library catalog records. Although limitations exist with searching for cartographic materials in OPAC systems, the examples provided show that libraries have to, and are starting to, think outside the traditional catalog interface to provide adequate search functionality for map and geographic information collections. There are many avenues where this can be explored, and early projects show signs of success. Continued research can reveal how Semantic Web developments, including linked data and resource description frameworks, and the exploration of different metadata standards will work to further enrich access to digital map collections and geographic databases.

## NOTES

1. <http://www.lib.umn.edu/apps/maphappy/>
2. <http://repository.tamu.edu/handle/1969.1/2490>

3. <http://mapsearch.nla.gov.au/index.php>
4. <http://www.davidrumsey.com/>
5. <http://africamap.harvard.edu/>

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VIAF. <http://www.viaf.org/> and <http://www.oclc.org/research/activities/viaf/default.htm>

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